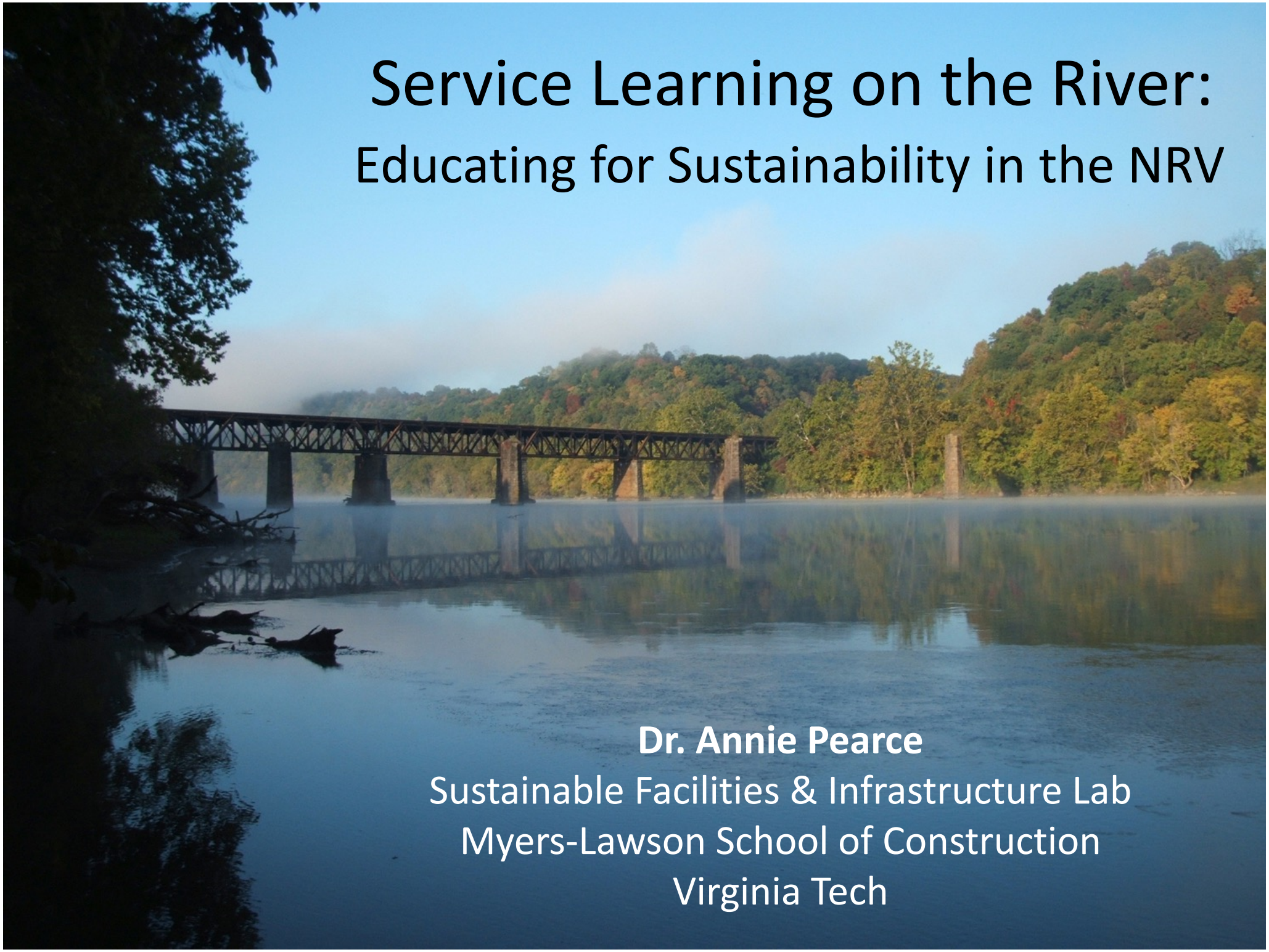


Service Learning on the River:

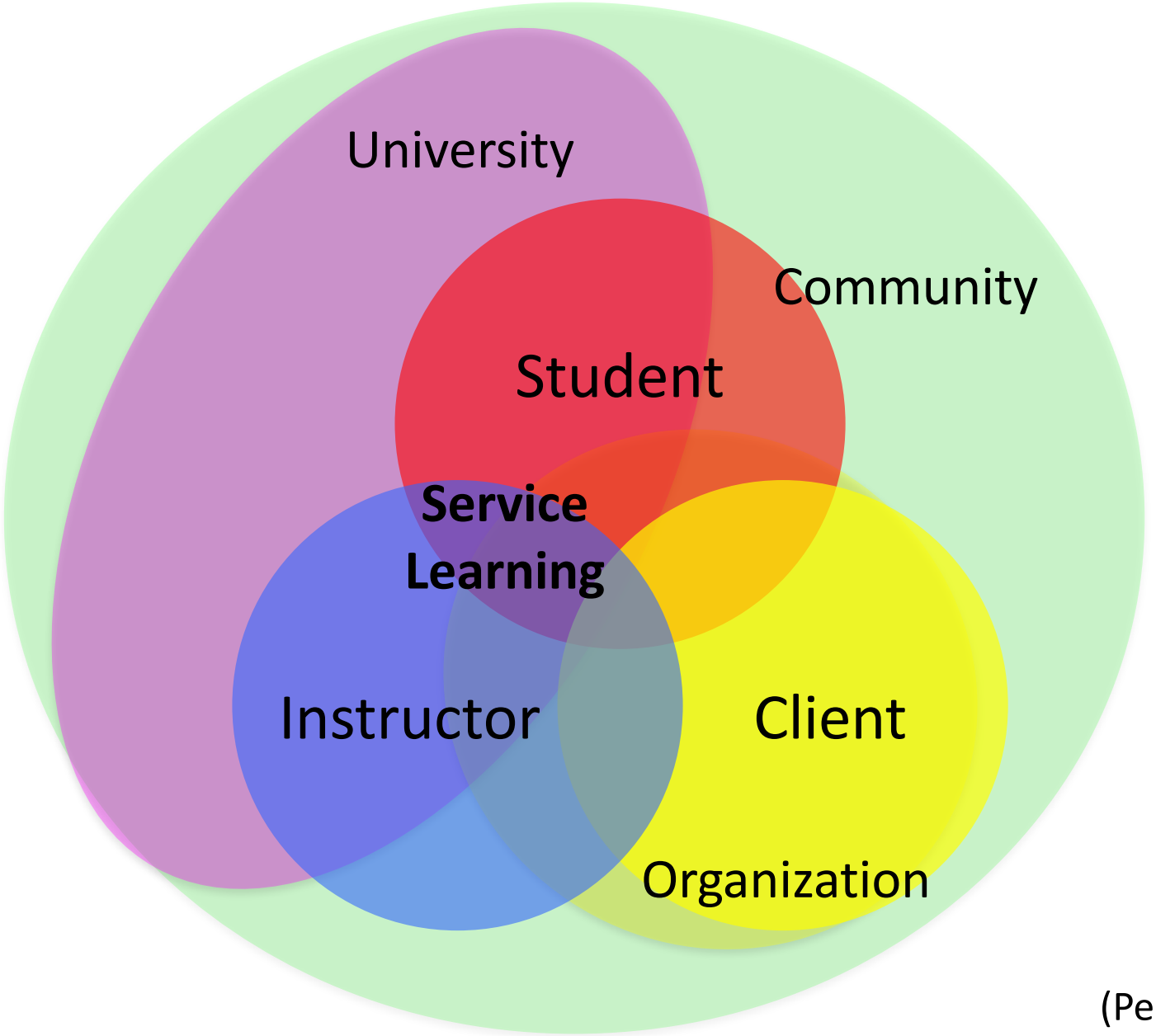
Educating for Sustainability in the NRV

Dr. Annie Pearce
Sustainable Facilities & Infrastructure Lab
Myers-Lawson School of Construction
Virginia Tech

What is Service Learning?

- Three essential elements (Howard 2003):
  - Service is provided to community to meet a real need
  - Students' academic learning is strengthened
  - Students' commitment is strengthened for:
    - Civic participation
    - Active democratic citizenship
    - Social responsibility
- Just because there is a hands-on component doesn't mean you're doing service learning…

Service Learning for Sustainability: A Contextual Client-oriented Model



(Pearce & Manion)

A good service learning project should…

- Allow the learner to practice skills learned in the classroom using real-life experiential learning;
- Provide an opportunity for the learner to interact with project recipients;
- Be feasible, considering the amount of time available in the specific course;
- Be complex enough to allow the learner to be challenged, but not overwhelmed;
- Contain an element that will allow for learning through reflection;
- Include components that can be evaluated to determine the relative success of the project and the effect of the experiential learning process.

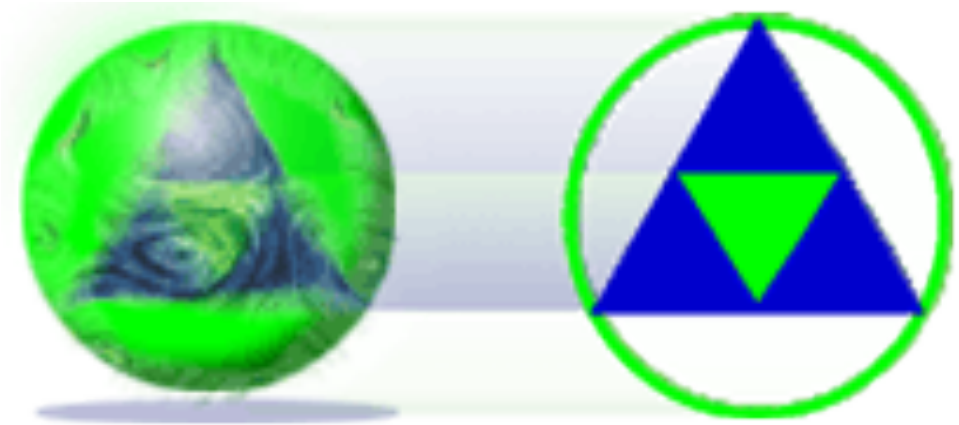
(Cline & Kroth)

Barriers to good service learning in construction courses

- Student mediocrity/lack of commitment
- Substandard workmanship
- Mistaken identity as a trade school
- Faculty workload (esp. on weekends)
- Finding time for reflection
- Non-traditional assessment/grading
- Construction safety/institutional liability
- Negative student perceptions of course structure

So why do it?

- It’s interesting and fun
- It benefits the community AND students
- It’s the absolute best way to experience tradeoffs and learn to manage them
- It results in tangible outcomes
- Never a dull moment!




Lee Hwy
New River
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1, 2
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626
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New River
W Main St
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Rock Rd W
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664
177
664
81
665
Four Rounds of
Fun So Far!

Round 1: Spring 2014

BC 5134:
Sustainable Facility Systems

Detailed facility assessment: Structural condition, site, interior finishes, systems, operational practices, comparable case studies, sustainable technology scan


CRAZY CAT LADY
STARTER KIT
No assembly required
ICANHASCHEEZBURGER.COM

Round 2: Spring 2015

BC 4334: Sustainable Bldg Performance Mgt

- Required senior-level course for Sustainable Building Performance track
- 8 students (All BC)

BC 5134: Sustainable Facility Systems

- Graduate elective course
- 8 students:
  - BC
  - Architecture
  - Civil (Structural/Construction)

Project-based learning:
Sustainability theory put into practice

Radford Animal Shelter: The Year of the Cat

Trying to actually fulfill identified needs…


F-1
C-4
A-5
C-2
B-2
C-5
A-3


ACMEPANEL
RADFORD, VA
ACMEPANEL
RADFORD, VA


Our first client…
NTG

Intermission

- Summer 2015:
  - Seniors graduated; others went on internships
  - A job site accident shut the project down in June
- Fall 2015/Spring 2016:
  - Instructor finished the project with help from local contractors
  - Ribbon cutting – May 2, 2016
    (over 12 months after project start)

Ribbon cutting euphoria convinced me to try again…

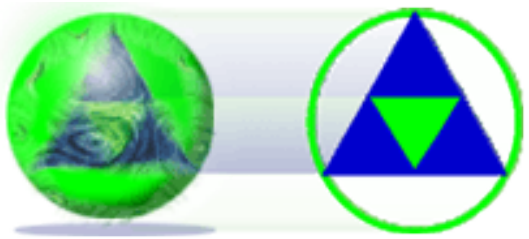
Round 3: Fall 2016

BC 5144: Sustainable Infrastructure Systems

- Sustainable Riverfront Development Plan
- Graduate-only class
- 18 students from multiple majors
- Presented Nov 21 to Council, City staff, Planning Commission, and Parks/Rec

F16 Class Project – Approach

- Inventory of existing assets/conditions:
  - Geographic assessment
  - Infrastructure systems review
  - Stakeholder analysis/interviews
- Review of precedents and local peers
- Sustainability opportunity assessment
- Visioning and concept development
- Stakeholder input
- Final public web site of findings



Goals for Sustainable Riverfront Development in Radford

1. Improve recreational and other sustainable uses of the river by residents and visitors.
2. Increase connectivity along and across the river as well as with key features/neighborhoods in the city.
3. Develop complementary destinations near, along, and across the river for residents and visitors.
4. Provide key supporting infrastructure to encourage economic activity by river users and beneficiaries.

Team West – Recreational Enhancement

Team South – West End Destinations

1 Business development

- Foundry redevelopment + bike trails
- West Main St. Village Center
- Radford Industrial Center

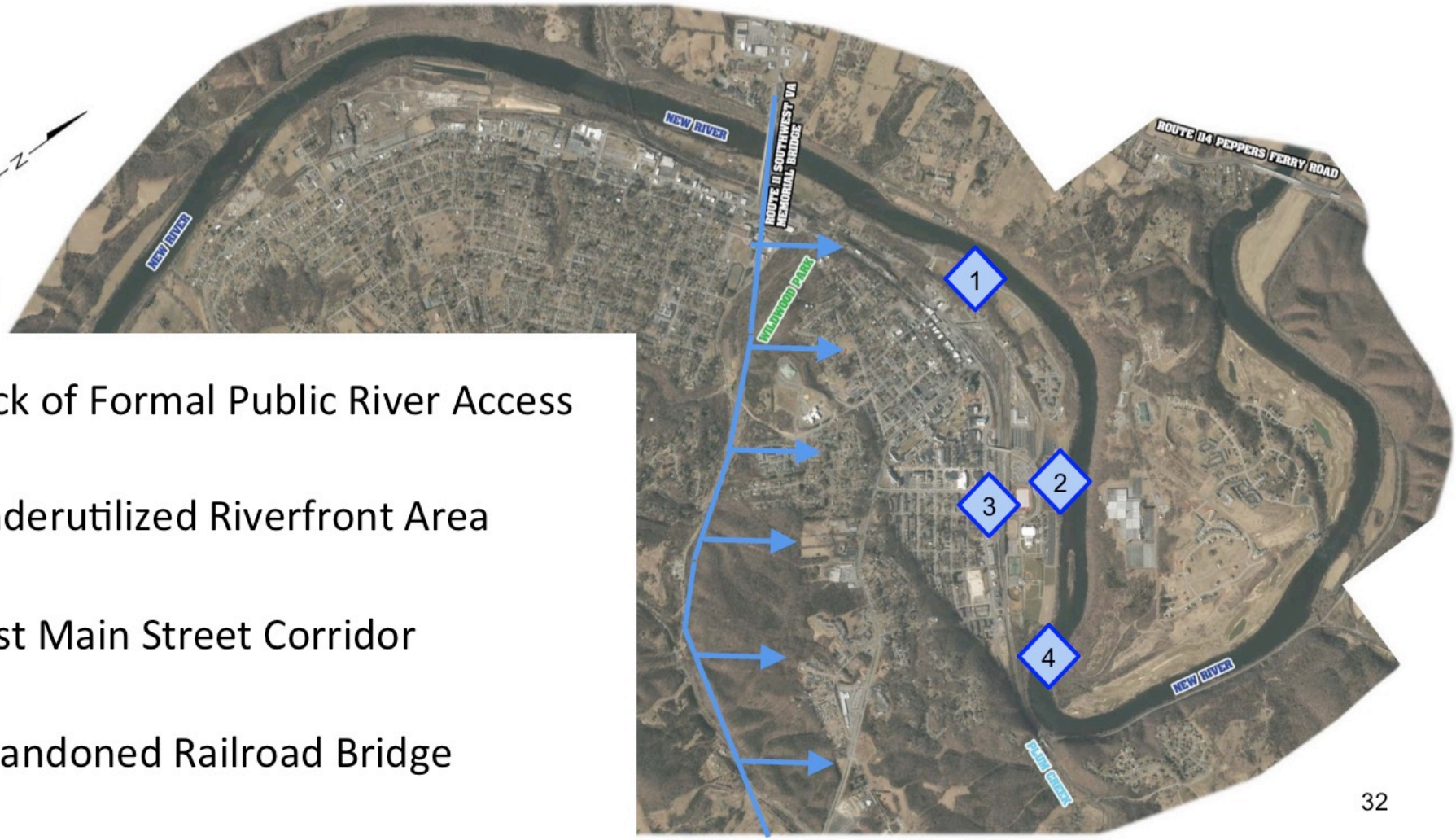
2 Outdoor activities

- Riverview Park (facilities)
- Historic Ingles Farm events
- River access, activities, art in park
- Old landfill site opportunity

3 Destinations outside city

- Proposed New River Heritage Museum & Welcome Center
- Mountain bike park
- The Sportsman campground

Team North – East End Destination Development

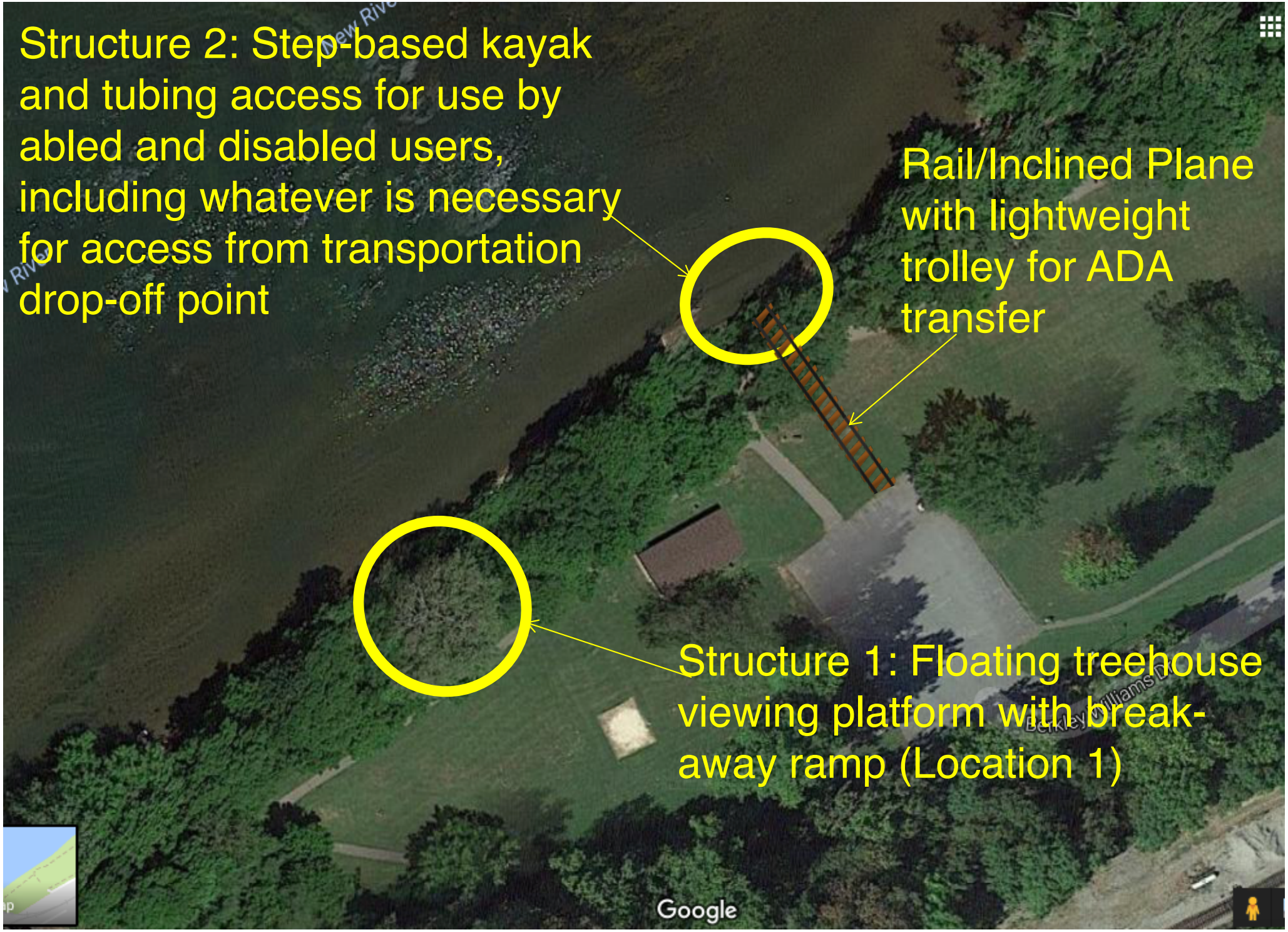


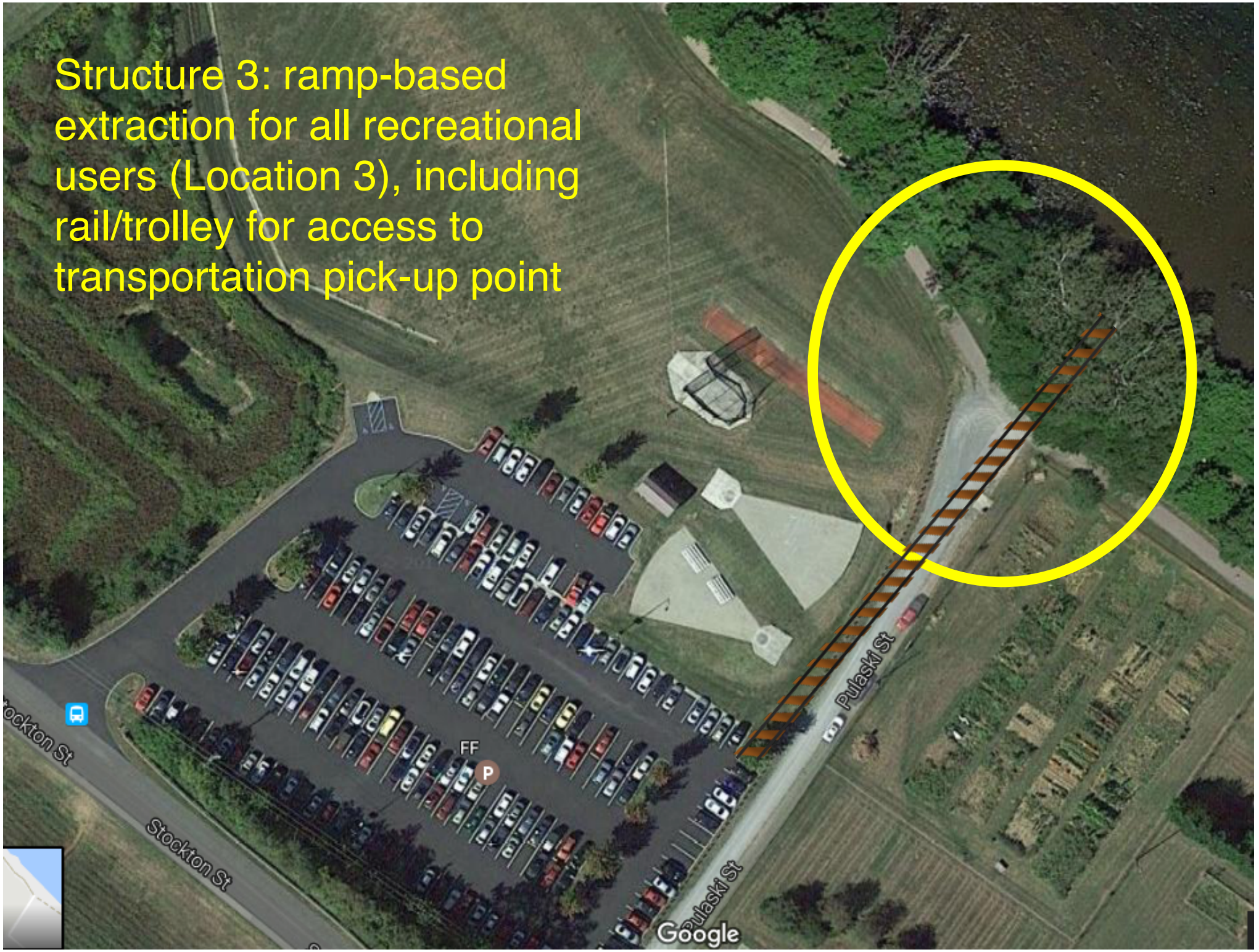
Key Points

1. Lack of Formal Public River Access
2. Underutilized Riverfront Area
3. East Main Street Corridor
4. Abandoned Railroad Bridge

Round 4: Spring 2017

- Conjoint class:
  - 4 grad students/21 seniors
  - Goal: sustainable river access for recreation in Bisset Park
- Multiple realignments:
  - USACE permits
  - Creativity battles
- Outcomes:
  - Design concepts
  - Implementation plan
  - Site investigation


Structure 2: Step-based kayak and tubing access for use by abled and disabled users, including whatever is necessary for access from transportation drop-off point
Rail/Inclined Plane with lightweight trolley for ADA transfer
Structure 1: Floating treehouse viewing platform with break-away ramp (Location 1)
Google


Structure 3: ramp-based extraction for all recreational users (Location 3), including rail/trolley for access to transportation pick-up point
Stockton St
Stockton St
Pulaski St
Pulaski St
FF
P
Google

Transit modification plan: revised route and capital modifications to provide regular connectivity between locations during the summer

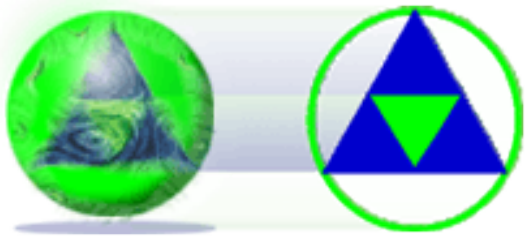
Bus modifications

Supporting infrastructure

Capital improvements


Outdoor Expo – Public Input

Popular Ideas



Reflection: Observations

- High risk/high reward pedagogy
- Key success factors:
  - Avoiding scope creep (need cutoff milestones!)
  - Project experience of client organization
  - Autonomy/resources of project champion
- There is a fine line between flexibility and chaos
- What if the project fails?
  - Risk to instructor/university vs. student vs. client
- River-related service learning poses special challenges
- Where/when to draw the line…


Glad we weren't mid-construction…
Thanks for your attention!
Annie Pearce
apearce@vt.edu

Backup Slides

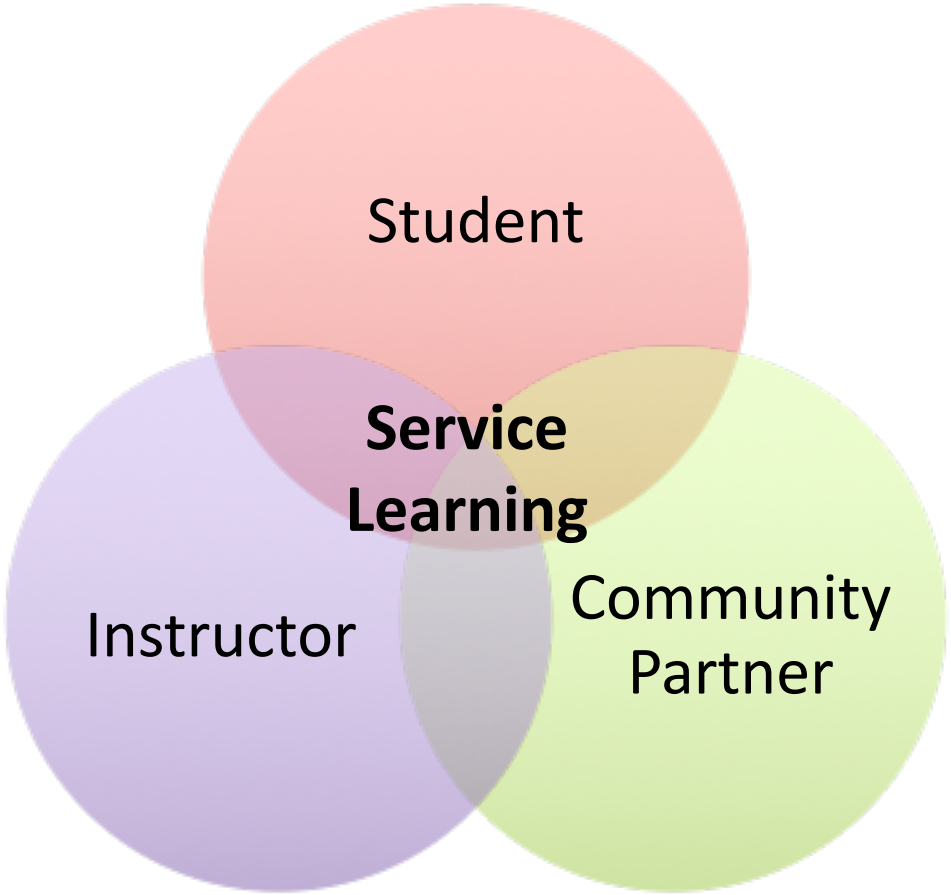
What Service Learning is NOT

A hands-on project with no stakeholder involvement

BOTH service AND learning!

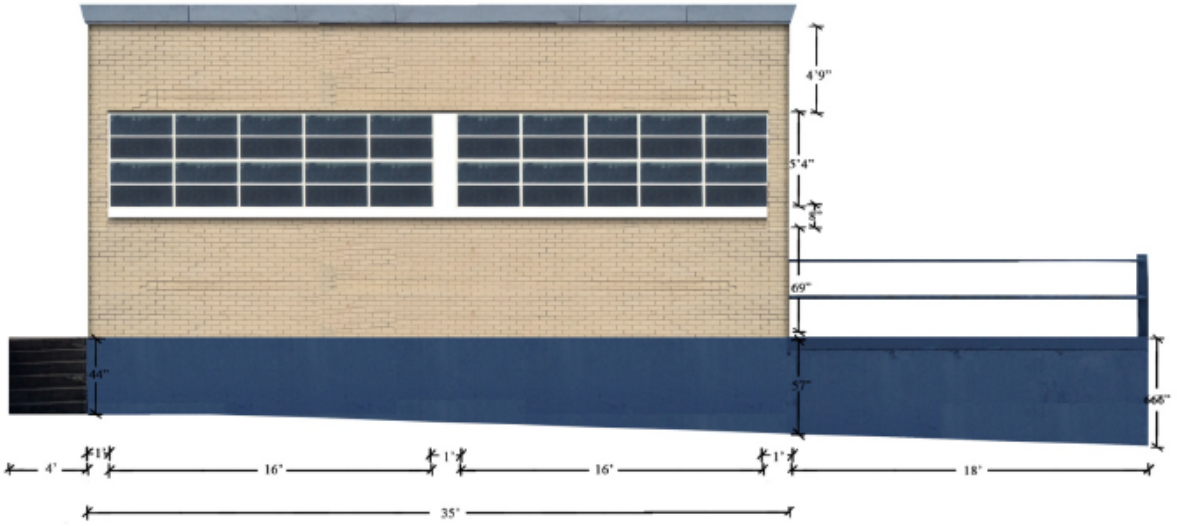
An experiment with a community guinea pig

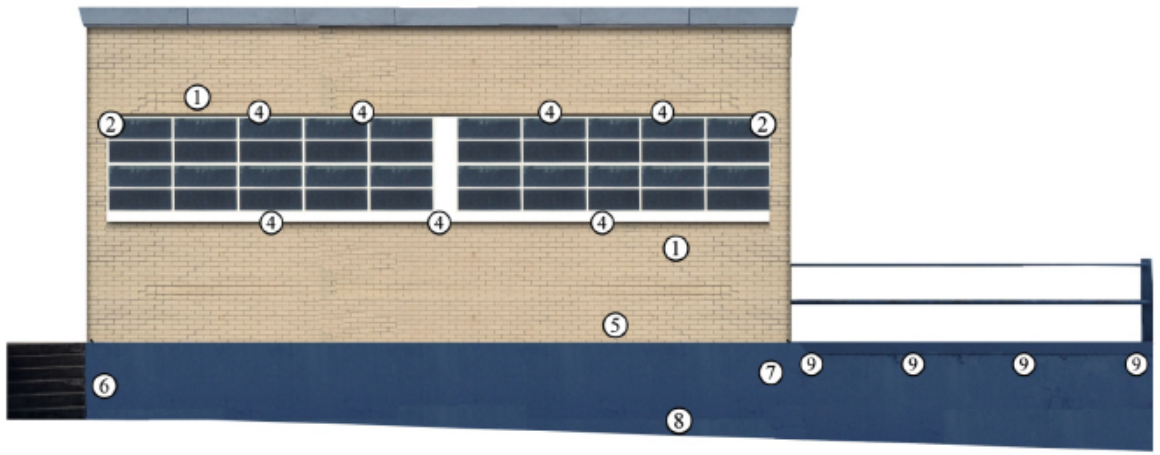
Conventional Model of Service Learning



(Swearingen)

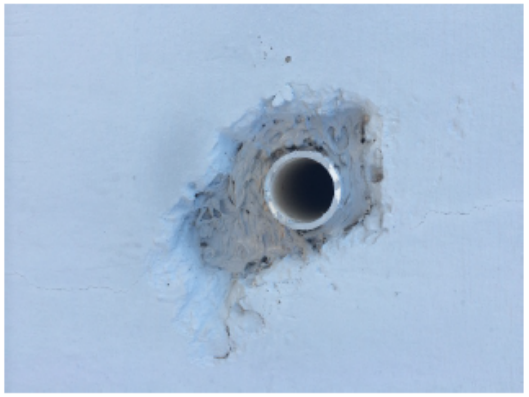
Photographic Inventory – East Elevation of Main Facility



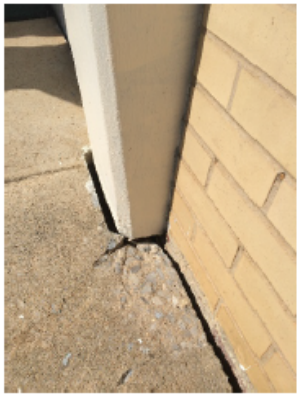


1. Cracks on brick wall
2. Disconnection /Gap
4. Rust
5. Faucet outlet
6. Plastic pipe outlet
7. Exposed rebar
8. Paint damage
9. Exposed steel structure

Photographic Inventory – Individual Photos of Condition/Details



Drain pipe openings on wall surface



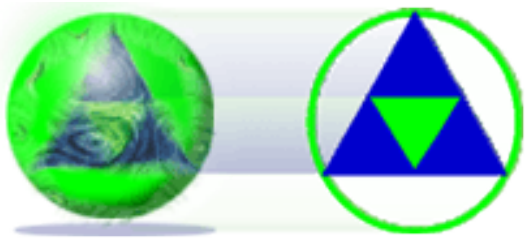
Gaps near foundation

Concrete Abrasion

Cracks on concrete surface

Exposed rebar in pavement & wall

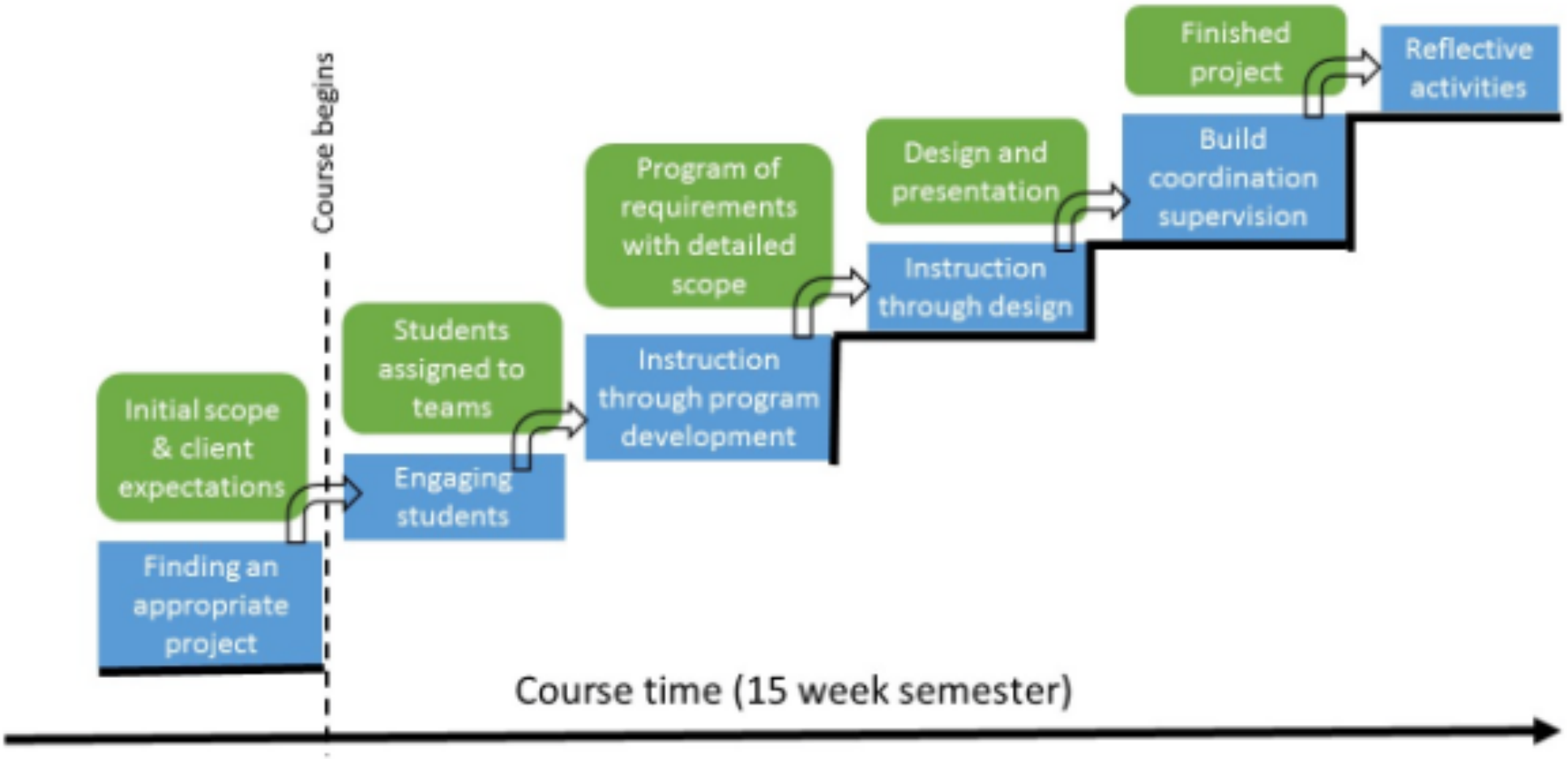
Exposed steel beam



Term Project Objectives (50% of grade)

- Listen to clients and articulate their requirements
- Brainstorm concept designs that would meet those requirements
- Pitch potential solutions to clients, and refine them based on their feedback
- Evaluate solutions based on cost, performance, and other criteria, and develop the best one
- Create a project execution plan to build the solution using available resources
- Implement the project execution plan
- Document everything in a professional fashion.

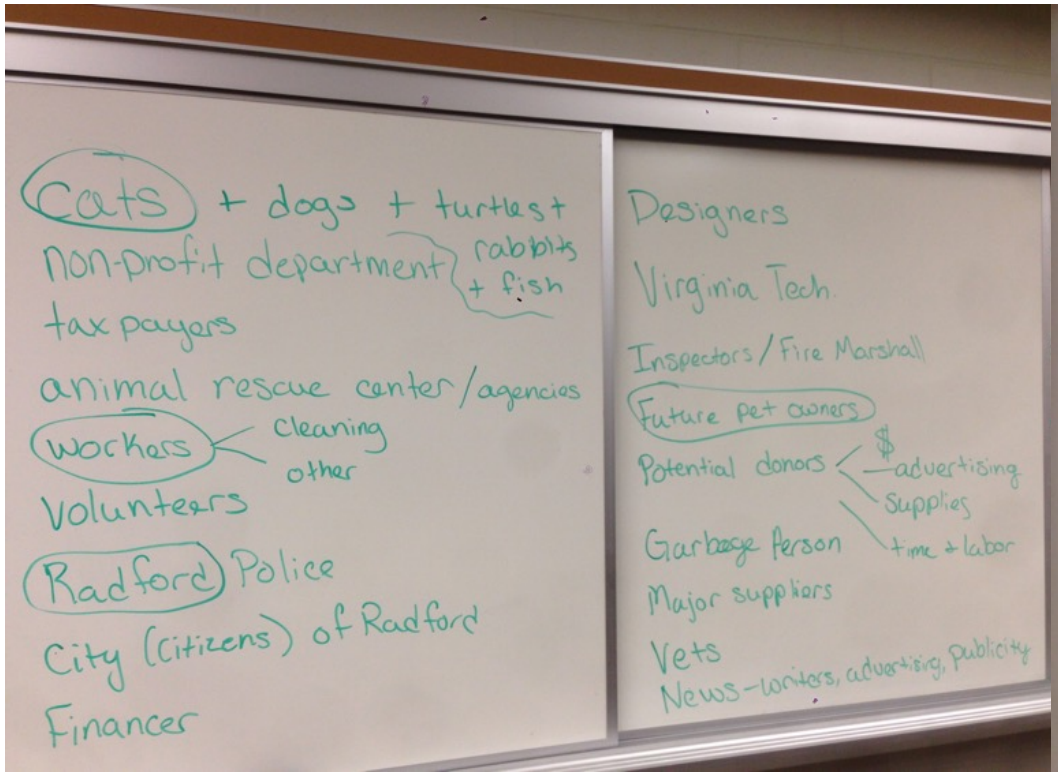
Course Structure

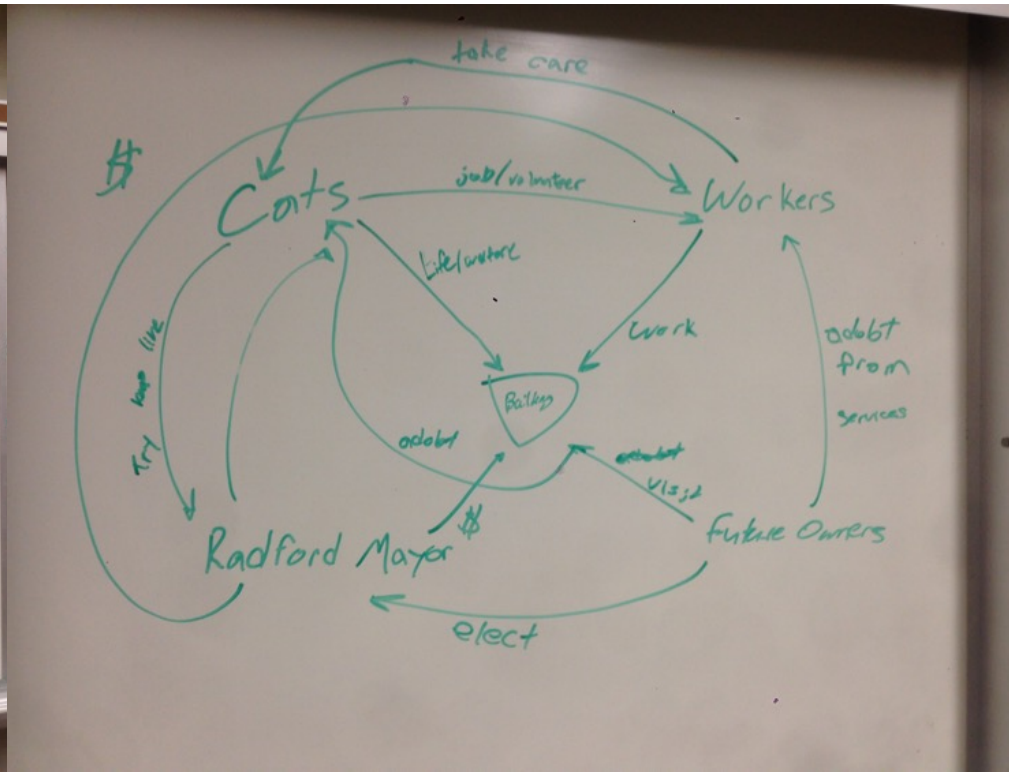


Program Development

Learning objectives:

- Identify key stakeholders/interests over your project's whole life cycle
- Characterize those interests using personae
- Distinguish between objectives and constraints
- Articulate objectives based on SMART criteria
- Develop a functional specification for a design solution
- Verify your functional spec and prioritized objectives with client

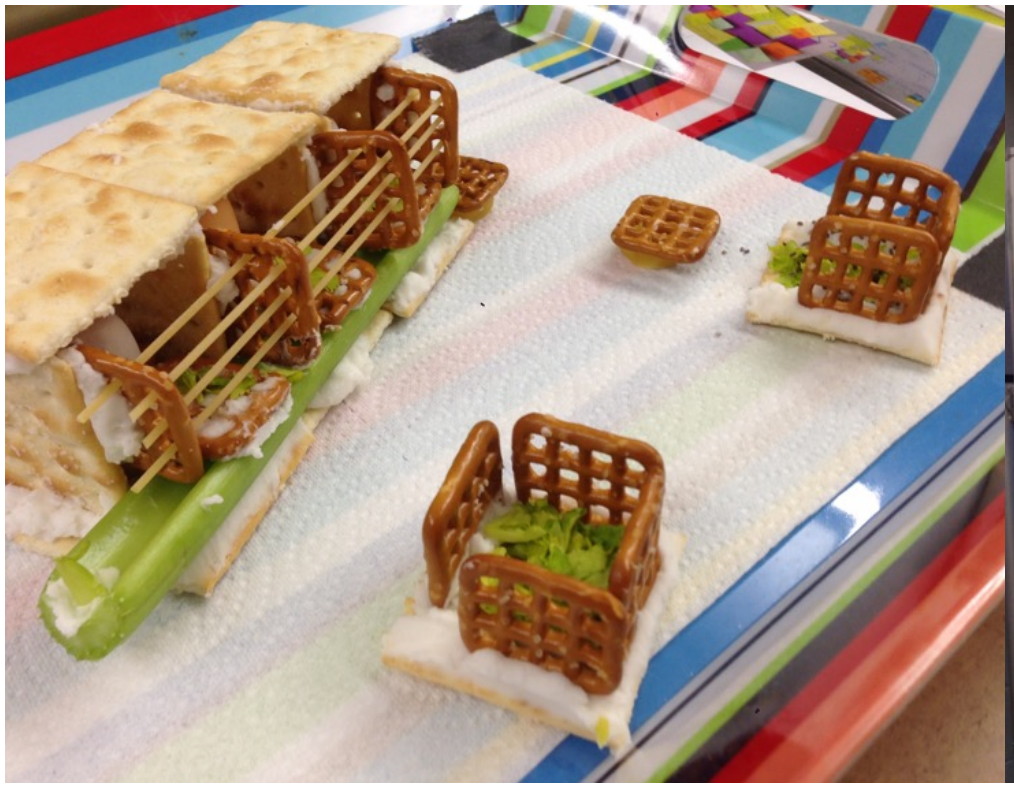


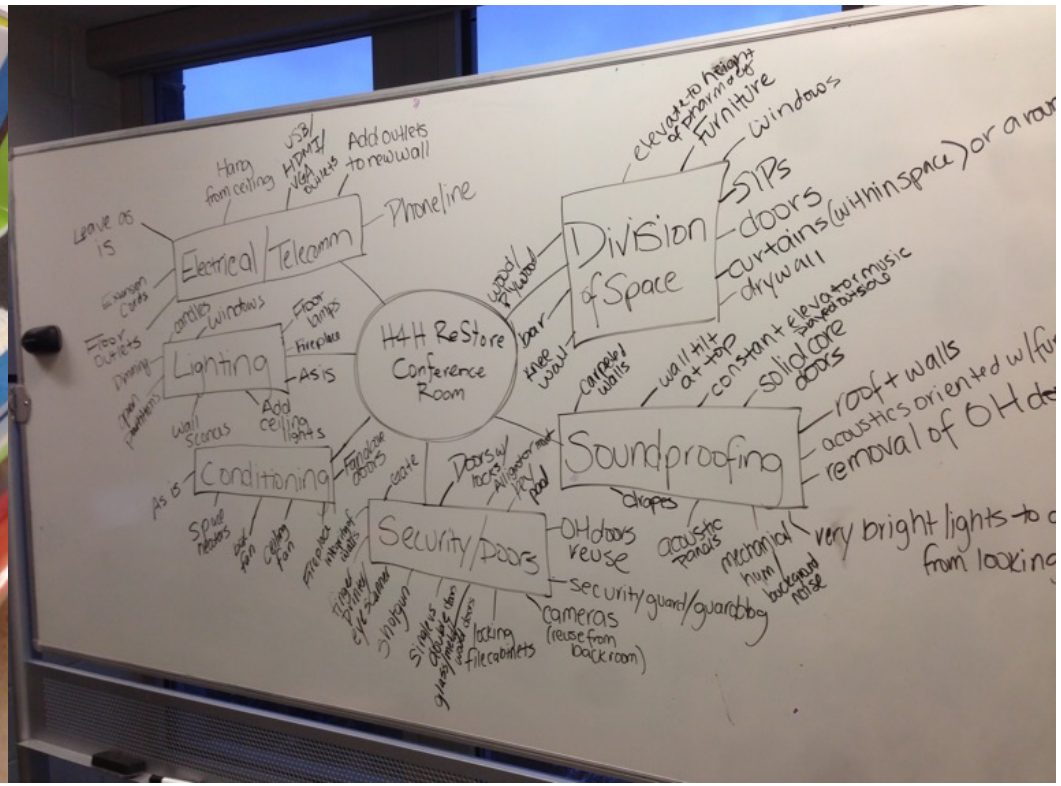


Design

Learning objectives:

- Employ creative/systematic concept generation approaches
- Refine concepts through scenarios presented to client
- Obtain stakeholder input/manage stakeholder expectations
- Develop design solution
- Apply life cycle costing/continuous value enhancement to fine-tune





Build

Learning objectives:

- Apply project planning and management techniques from the whole curriculum
- Recruit necessary resources (including labor, materials, equipment, and funding)
- Promote the projects through various outreach efforts
- Experience the “planned vs. actual” differential
- Resolve any issues encountered
- Document the experience for further reflection

Key Systems Characterization

	Facility Performance Summary				
S.No	**Building Systems**	**Components**	**Type of Material**	**System Condition**	**Comments**
1	Structural System	Building Frame	Steel/Concrete/CMU	Good	3 slightly exposed I-Beams in brick façade.
		Structural Foundation	Reinforced Concrete	Good	Some exposed rebar in foundation.
		Soil/ Geotechnical		Good	Flood zone (basment area has flooded)
2	Building Envelope	Exterior Walls & Insulation	Brick on CMU/Precast & CMU (No Insulation)	Poor	Exterior walls are takeing in water causing brick to freeze and thaw.
		Windows & Insulation	Metal framed/Single payne	Poor	Windows need to be sealed where windows meet brick.
		Exterior Doors	Metal /Wood/Single pane glass	Fair	Wood door frame is deteriorating, and some doors could be sealed.
		Storefront & Shutters	Glass/Wood	Good	The glass is single pane, but is in good shape
		Balconies / Porch	Reinforced Concrete	Good	Minor cracking and some exposed rebar.
3	Roofing	Roof Components	Concrete on metal deck	Poor	We believe the roof is taking in water, and causing the face brick to freeze and thaw. There's also a good amount of efflorescence on the brick close to the roof. Animal housing building has a new roof.
4	Surface Fittings	Lighting Fixtures	Cannot be ascertained	Fair	Can be replaced with LEDs to improve energy efficiency
		Drainage Fittings	Metal	Poor	Rusted with jammed openings. Need to be replaced or removed and wall surface sealed
		Electrical Outlets	Cannot be ascertained	Good	In proper working condition
		HVAC	Single AC units	Poor	AC units are place over doors. The penetrations around the AC units were not properly sealed.
5	Other	Stairs	Reinforced Concrete	Good	Cracking and chipping of concrete, and some exposed rebar.
		Openings / Penetrations		Poor	The main building has multiple unnecessary penetrations in the wall from the structure previous use. The doggie doors are no flush with the penetration, and this allows water and air to enter/exit.